

WHAT WE CLAIM ARE:

1. A linear image sensor chip comprising:

a semiconductor substrate having an elongated shape;

an image pickup section formed on said semiconductor substrate,

5 said image pickup section including (i) at least one photodiode group composed of a plurality of photodiodes formed in one surface of said semiconductor substrate along a longitudinal direction of said semiconductor substrate and (ii) a charge transfer element provided for each said photodiode group;

a peripheral circuit section formed on said semiconductor substrate

10 and disposed outer than said image pickup section with respect to the longitudinal direction;

a plurality of bonding pads formed on the surface of said

15 semiconductor substrate outer than said at least one photodiode group with respect to the longitudinal direction, each of said bonding pads having an exposed surface;

a plurality of metal lines formed on the surface of said semiconductor substrate, each of said metal lines having an end connected to one of said bonding pad and another end connected to said peripheral circuit or said charge transfer element; and

20 a light-suppressing layer formed above said semiconductor substrate and covering a peripheral area of each said photodiode.

2. A linear image sensor chip according to claim 1, wherein all the bonding pads having an exposed surface are formed on the surface of said semiconductor

25 substrate outer than said at least one photodiode group with respect to the longitudinal direction.

3. A linear image sensor chip according to claim 1, wherein each of said bonding pads is disposed outer than said peripheral circuit section with respect to the longitudinal direction.

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4. A linear image sensor chip according to claim 1, wherein said light-suppressing layer covers also said peripheral circuit section.

5. A linear image sensor chip according to claim 1, wherein said light-suppressing layer covers as viewed in plan said metal lines at least in a region sideward along said at least one photodiode group.

6. A linear image sensor chip according to claim 1, wherein:
said image pickup section includes four photodiode groups
juxtaposed along a direction crossing the longitudinal direction;
said peripheral circuit section includes an output amplifier provided for each said charge transfer element and electrically connected to an output terminal of a corresponding charge transfer element; and
the linear image sensor chip further comprises a color filter array
disposed for each of three photodiode groups of said four photodiode groups, said color filter arrays generally constituting a multicolor color filter array necessary for taking a color image.

7. A linear image sensor chip according to claim 6, further comprising a color filter array disposed above remaining one of said four photodiode groups.

8. A linear image sensor, comprising:

a package including a bottom portion, sidewall portions and a lid portion generally defining an elongated inner space, and a plurality of lead electrodes, said lead electrodes extending from an end region of said elongated inner space, passing through said sidewall portions, and reaching an external space, said bottom portion and said sidewall portions being made of light shielding material and said lid portion having an elongated window made of transparent material;

a linear image sensor chip fixed in the inner space of said package, said linear image sensor chip including (1) a semiconductor substrate having an elongated shape along a direction generally coincident with the longitudinal direction of said bottom portion, (2) an image pickup section formed on said semiconductor substrate, said image pickup section including (i) at least one photodiode group composed of a plurality of photodiodes formed in one surface of said semiconductor substrate along a longitudinal direction of said semiconductor substrate and (ii) a charge transfer element provided for each said photodiode group, (3) a peripheral circuit section formed on the semiconductor substrate and disposed outer than said image pickup section with respect to the longitudinal direction of said semiconductor substrate, (4) a plurality of bonding pads formed on the surface of said semiconductor substrate outer than said at least one photodiode group with respect to the longitudinal direction of said semiconductor substrate, each of said bonding pads having an exposed surface, (5) a plurality of metal lines formed on the surface of said semiconductor substrate, each of said metal lines having an end connected to one of said bonding pads and another end connected to said peripheral circuit or said charge transfer element, (6) a light-suppressing layer formed above said semiconductor substrate and covering a

peripheral area of each said photodiode; and

a plurality of bonding wires each electrically connecting one of said lead electrodes to a predetermined one of said bonding pads.

5 9. A linear image sensor according to claim 8, wherein all the bonding pads having exposed surfaces are formed on the surface of said semiconductor substrate outer than said at least one photodiode group with respect to the longitudinal direction of said semiconductor substrate.

10 10. A linear image sensor according to claim 8, wherein each of said bonding pads is disposed outer than said peripheral circuit section with respect to the longitudinal direction of said semiconductor substrate.

11. A linear image sensor according to claim 8, wherein said light-suppressing
15 layer covers also said peripheral circuit section.

12. A linear image sensor according to claim 8, wherein said light-suppressing layer covers as viewed in plan said metal lines at least in a region sideward along said at least one photodiode group.

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13. A linear image sensor according to claim 8, wherein:

said image pickup section includes four photodiode groups juxtaposed along a direction crossing the longitudinal direction of said semiconductor substrate;

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said peripheral circuit section includes an output amplifier provided for each said charge transfer element and electrically connected to an output

terminal of a corresponding charge transfer element; and

said linear image sensor chip further comprises a color filter array disposed for each of three photodiode groups of said four photodiode groups, said color filter arrays generally constituting a multicolor color filter array necessary for taking a color image.

14. A linear image sensor according to claim 13, further comprising a color filter array disposed above remaining one of said four photodiode groups.

15. A linear image sensor according to claim 8, wherein each said lead electrode is disposed outer than said image pickup section with respect to the longitudinal direction of said semiconductor substrate.

16. A linear image sensor according to claim 8, wherein each said lead electrode is disposed outer than said peripheral circuit section with respect to the longitudinal direction of said semiconductor substrate.